RC 907/908 – EV35

Ethernet to V.35 Interface Converter

User Manual

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Chapter 1. Introduction

1.1 Product Introduction

RC907/908-EV35 series interface converter, or media converter, is designed to transmit Ethernet data over V.35 network. Since more and more V.35 network resources are being deployed, various types of data transmission solutions that make use of V.35 links will be widely accepted by end-users.

RC907-EV35 series interface converters are standalone interface converters. Every unit of device has an independence built-in power supply, and can be placed on the table.

RC 908-EV35 series interface converters are slide-in modular interface converters.
They can be installed into Dynamix RC series 16-slot chassis (19' 3U high chassis), or 4-slot chassis (19' 1U high chassis), or single slot chassis.
When installed into 16-slot or 4-slot chassis, it can be mixed with other Dynamix Series products (e.g. copper-to-fiber media converters, single-port optical multiplexers) to enable uniform network management.
RC 907-EV35 interface converters can be deployed at the remote site to work in pairs with RC908-EV35.

RC907/908-EV35 (Rev. B) has interoperability with the previous version (Rev. A). The differences between the two versions are only at Ethernet interfaces. So it is not necessary to consider other properties when they interconnect with each other. The bandwidth setup and clock phase configuration of Rev. B are the same as those of Rev. A. Please consult our technical support if encountering any problem.

1.2 Product Specifications

◆ V.35 interface:

Physical characteristics:	Compliant with V.35 interface standard
Connector type:	HDB26 female connector (26 pin female port)
Working mode:	DTE
Bit rate:	Dependent on DCE equipment, the maximum bit rate up

to 8Mbps

◆ Ethernet interface

Connector type: RJ-45 interface, CAT.5/enhanced CAT.5 wires, and the maximum transmission distance up to 100m
Bit rate: 10Mbps
Duplex mode: Full/half duplex auto-negotiation
Compliance: IEEE 802.3
Other capabilities:

1. The function of reporting V.35 signal loss alarm to Switches
2. Supports IEEE 802.1d Spanning Tree and IEEE 802.1q VLAN protocols
3. Supports over-sized Ethernet data frame up to 1595 bytes.
4. Supports IEEE 802.3x flow control in full duplex mode
5. Supports back pressure flow control in half duplex mode
6. Built-in 1k MAC address table with address filtering capability to improve the efficiency of the V.35 link
7. Built-in SDRAM 64M memory to alleviate data congestion

◆ Network management capabilities for RC908-EV35 (NM software is optional)

The network management capabilities include:

1. Set up the phase relationship between transmit/receive data and transmit/receive clock at V.35 interface;
2. Set up of the buffer capacity;
3. Report operating status of Ethernet port to SNMP server;
4. Set up full/half duplex mode at Ethernet interface;
5. Set up fault-pass-through function;
6. Close the Ethernet interface and disable the modular through NMS software;
7. Keep history record of all events.

1.3 Explanation for the Front Panel and Indicators

1.3.1 The Indicators on the Front Panel

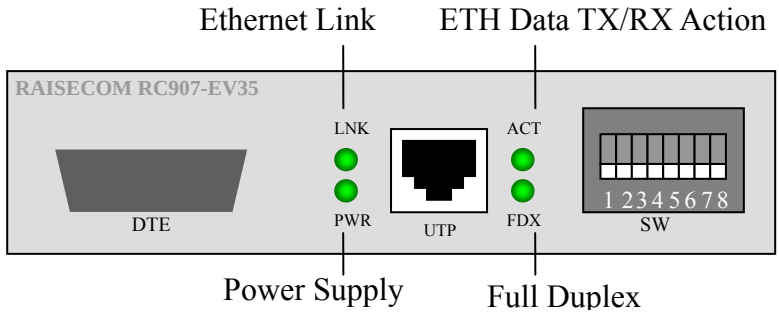


Figure 1. The front panel of RC907-EV35

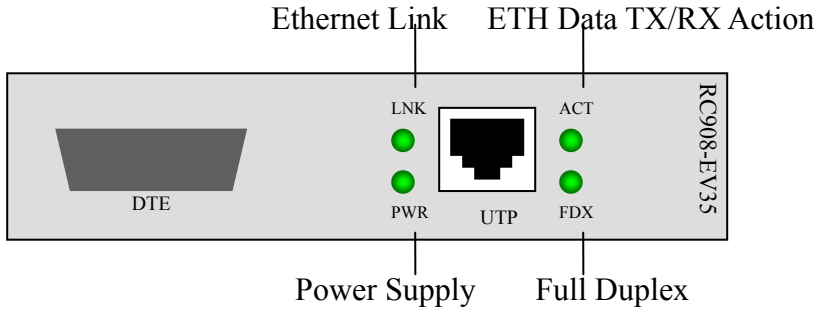


Figure 2. The front panel of RC908-EV35

1.3.2 The Definitions of Indicators

Ethernet Link (LNK): On: Ethernet link is properly connected
Off: Ethernet link is disconnected
Ethernet data TX/RX Action (ACT): Flashing: Transmitting or receiving data
Full Duplex Mode (FDX): On: Full duplex mode
Off: Half duplex mode
Power supply (PWR): On: The power supply is in good condition
Off: The power supply is disconnected.

The connector types of the interface are as the following.

V.35 interface:
The DTE connector: HDB26 female connector. Please refer to Chapter 3 for details of the interface definition and cable connection.

Ethernet interface:
The UTP connector: Unshielded twisted pair connector for Ethernet. Please refer to Chapter 3 for details of the interface definition and cable connection.

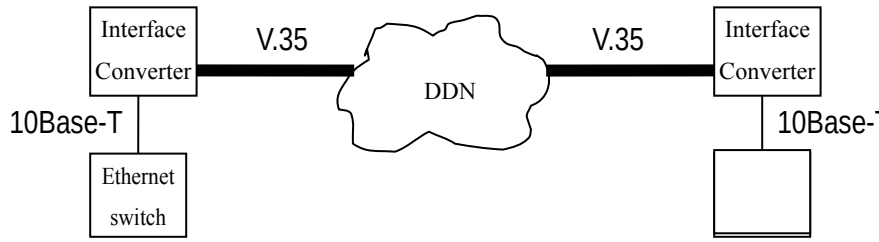
Chapter 2. Connection Configuration

2.1 Interface Converter Interconnection

When connecting interface converters, it is required to comply with the specific connection article numbers according to the following table. Otherwise, the link will not be established, or abnormal data transmission will occur.

The Host Site	The Remote Site
RC908-EV35	RC908-EV35
RC908-EV35	RC907-EV35

2.2 Typical Applications



- DDN leased line is utilized to extend the data transmission distance of Ethernet
- IEEE802.1q protocol is supported to ensure the key features of most mainstream products, such as between-switch VLAN and TRUNK functions.
- RC907/908-EV35 series interface converters can be used to provide private DDN network solutions for organizations and departments such as finance, government and education etc.

2.3 Duplex Mode Configuration

RC907/908-EV35 series Ethernet to V.35 interface converters are devices used to conduct media conversions and extend transmission distances. When connecting RC907/908-EV35 interface converters with other network equipment, they need to cooperate with each other to work properly. Different duplex mode configurations on network equipment interfaces will affect the transmission efficiency of the network. The recommended configurations are listed in the following table when interconnecting different network equipment.

The working mode of other network equipment	**RC907/908-EV35 working mode**
10Mbps full duplex	The interface converter shall be configured to full duplex mode when auto-negotiation fails.
10Mbps half duplex	The interface converter shall be configured to half duplex mode when auto-negotiation fails. (Factory default)
Auto-negotiation	No need for configuration. (Factory default)
100Mbps full duplex	The interface converter cannot connect with 100Mbps interfaces of other equipment.
100Mbps half duplex	The interface converter cannot connect with 100Mbps interfaces of other equipment.

2.4 Connection with other network equipment (at Ethernet port)

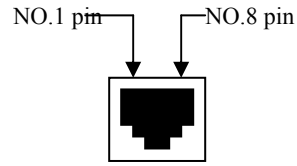
RC907/908-EV35 series interface converter supports MDI/MDIX auto-sensing.

Chapter 3. Installation and Preparation

1. First, please choose the appropriate configuration structure to be applied, referring to the sketch map of recommended basic connection structure.

2. Make sure that the V.35 cable matches the connected equipment. If RC907/908-EV35 interface converter is used to connect DCE, please use DTE cable.

3. Use CAT.5 UTP to connect the Ethernet port of RC907/908-EV35 interface converter, and make sure that the length of the UTP cable does not exceed 100m.



The pin definitions of the RJ45 interface on RC907/908-EV35 interface converter are as follows.

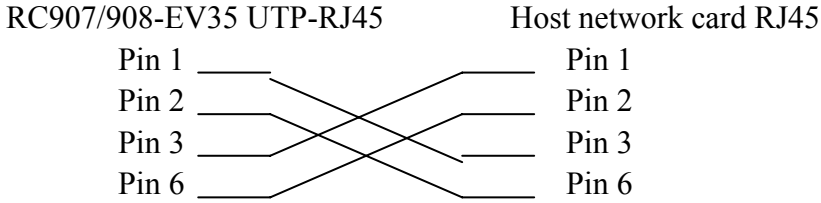
Pin number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Definition	TX+	TX-	RX+	Not Used	Not Used	RX-	Not Used	Not Used
Details	Output+	Output-	Input+	Hang	Hang	Input-	Hang	Hang

The following diagram indicates the correct line sequence of straight-through UTP cable.

RC907/908-EV35 UTP-RJ45 Ethernet device RJ45

Pin 1 _____ Pin 1
Pin 2 _____ Pin 2
Pin 3 _____ Pin 3
Pin 6 _____ Pin 6

The following diagram indicates the correct line sequence of crossover UTP cable.



In these two connection types, Pin 1 and Pin 2 are in a twisted pair, and so are Pin 3 and Pin 6. Since RC907/908-EV35 interface converters support MDI/MDIX auto-sensing function, users can adopt either kind of the above cables.

4. The V.35 interface adopts HDB26 female connector，the definitions are as follows:

Pin Name	Input/Output	Pin Number
Chassis Ground — CGND	-	1
Signal Ground — GND	-	7
Receive Data (A) — RD(A)	I	3
Receive Data (B) — RD(B)	I	21
Receive Timing (A) — RCK(A)	I	17
Receive Timing (B) — RCK(B)	I	25
Send Data (A) — TD(A)	O	2
Send Data (B) — TD(B)	O	11
Send Timing (A) — TCK(A)	I	15
Send Timing (B) — TCK(B)	I	23
Terminal Timing (A) — SCTE(A)	O	24
Terminal Timing (B) — SCTE(B)	O	16
Request to Send — RTS	O	4
Clear to Send — CTS	I	5
Data Set Ready — DSR	I	6
Data Carrier Detect — DCD	I	8
Data Terminal Ready — DTR	O	20

I—input; O—output

Note: It is strictly forbidden to hot-swap the V.35 interface with power supply applied!

5. RC907/908-EV35 interface converter must work in pairs point to point. There shall be DCE equipment between two converters. It cannot connect with the third party's branded interface converter.

6. Ambience:
   Working temperature: 0-45℃
   Humidity: 5%~90% non-condensing

7. Power supply: AC/DC optional
   AC: 220V/50Hz (input ranges form 165 to 265V)
   DC: －48V (input ranges from –36 to -72V)
   Power consumption: ≤ 5W

8. Dimensions (for RC907-EV35 standalone interface converter)
   Dimension: 120 (width) x 32 (height) x 157 (depth) mm

9. We recommend that users install and configure the interface converter after reading the next chapter and finishing the relevant preparations.

Chapter 4. Dip-switch Setup

The configuration dip-switch is on the front panel of RC907-EV35. (It is on the back panel of RC908-EV35.) The definitions of the dip-switch are as follows.

◆ The 1st bit: Duplex mode setup

This bit is used to configure the duplex mode when the auto-negotiation at Ethernet interface fails.

ON: Full duplex mode when auto-negotiation fails

OFF: Half duplex mode when auto-negotiation fails (default)

According to the port of user devices, this bit should be configured as follows.

Port of User Devices	The 1st Bit Setup	Actual Working Mode
10/100Mbps auto-negotiation	Any	10Mbps full duplex mode
Forced 10Mbps half duplex	OFF	10Mbps half duplex mode
Forced 10Mbps full duplex	ON	10Mbps full duplex mode
10Mbps full/half duplex auto-negotiation	Any	10Mbps full duplex mode

Since the Ethernet interface of RC907/908-EV35 works at 10Mbps full/half duplex mode auto-negotiation, it cannot be connected with the forced 100Mbps interface of other equipment.

◆ The 2nd bit: Fault-Pass-Through function setup

On: Fault-Pass-Through function enabled. In this case, the DSR alarm of V.35 interface can lead to complete failure of the Ethernet port, and the link fault will be reported to the Switch. When the DSR alarm of V.35 interface disappears, the Ethernet port will automatically recover.

Off: Fault-Pass-Through function disabled (factory default). In this case, the DSR alarm will not have effect on the Ethernet port.

◆ The 3rd ~5th bit: Buffer size setup

Since the bit rate of V.35 interface is dependent on the rate of connected DCE equipment, it varies in large range. It is necessary to adjust the size of buffer. It can

not only prevent long time delay, but also avoid packet loss caused by sudden data flooding. It is suggested that the buffer size be configured as the following table.

WAN Interface Rate (bit/s)	DIP-switch		
	3rd Bit	4th Bit	5th Bit
≥2M	OFF	OFF	OFF
> 1M	OFF	ON	ON
> 512K	ON	OFF	ON
> 256K	ON	ON	OFF
> 64K	ON	ON	ON
≤64K	ON	ON	ON

◆ The 6th bit: TX CLK phase selection switch.

It provides various options for different phase relationships of transmitting data and TX clocking at V.35 interface between different brands DCE equipment.

OFF: positive phase (default).

ON: negative phase.

◆ The 7th bit: RX CLK phase selection switch.

It provides various options for different phase relationships of receiving data and RX clocking at V.35 interface between different brands DCE equipment.

OFF: positive phase (default).

ON: negative phase.

◆ The 8th bit: Reserved bit.

The factory default setup of the dip-switch:

DIP-switch	1	2	3	4	5	6	7	8
ON								
OFF	■	■	■	■	■	■	■	■
Details	Half duplex	Fault Pass Through disabled	Maximum buffer size			Positive phase	Positive phase	No Meaning

Note:

1. Please use the 1st bit to configure the half/full duplex mode of converters following the instructions in 2.3 Full Duplex Mode Configuration, Chapter 2.

2. The 3rd ~ 5th bits of the dip-switch can be configured according to the above table to achieve the best transmission performance.

3. Only if all bits of the dip-switch are set to the factory default status, network management software can command, configure and inquire the status of the interface converter; Otherwise, the software has the inquiry function only.

After finishing the above steps, the power supply of the device can be switched on. If there is any problem, please refer to the last chapter – “Troubleshooting” for operation and maintenance.

Chapter 5. Troubleshooting

If there is any problem during the installation and operation, please try the following solutions. If the problem cannot be solved yet, please contact distributors for technical support.

◆ **PWR indicator is not on**

Answer: Power supply fails. Check whether the power supply is working properly, and make sure the power cable for –48V DC is not reversely connected.

◆ **Link indicator (LNK) is off**

Answer: Please check if the link is disconnected.

Please check whether the bit rate matches. The bit rate of the Ethernet equipment interface connected with the interface converter should be auto-negotiation or fixed 10Mbps.

◆ **LNK is on and ACT is flashing rapidly and continuously, but the equipment cannot be pinged through.**

Answer: In most cases, the reason is that the interface converter is connected with 100Mbps network equipment. RC907/908-EV35 can only connect with 10Mbps or auto-negotiation interfaces. Please verify the bit rate of the connected network equipment.

◆ **LNK is on and ACT is flashing intermittently at normal status, but the equipment cannot be pinged through.**

Answer: The reason may be that the phase relationship between the data and the clock of DCE V.35 interface is not the same as the configuration of the interface converter. Please reconfigure the 6th and 7th bits of the dip-switch.

◆ **Severe packet loss**

Answer: The possible reasons for severe packet loss are as follows:

1. The duplex mode of the Ethernet interface of the interface converter is not matching with that of the Ethernet equipment. Please refer to 2.3 Full Duplex Mode Configuration, Chapter 2.

2. There is some problem with connection between twisted pair and RJ-45 connector.
3. If there are bit errors in V.35 link, please check equipment alarm function, or test bit error rate of V.35 link by bit error tester.
4. If the traffic through converter increases suddenly, it may cause congestion within a short time, and result in disconnection of the network. In this case, the network service with huge amount of traffic should be paused and restarted after 10 seconds, and the network will be back to normal condition. However, if a long time disconnection occurs, it is abnormal. Please check the operation condition of equipments.

To improve the network efficiency, both the Ethernet equipment and the interface converter shall be set in full duplex mode, with great attention to the matching of working modes. RC907/908-EV35 may not be suitable for some IP-based image transmission equipments.

Since the bit rate of pinging large-size packets may exceed transmission capability of V.35 link, many packet losses may occur. To solve this problem, please try to increase the timeout parameter of the 'Ping' command.

◆ **Network management software can only review, but not conduct configuration**

Answer: The possible reason is that some bits of the dip-switch are not set on the default status. Please refer to Chapter 4 for details.